Component of Statistics Canada Catalogue no. 82-003-X
Health Reports

Article

Adults' use of health services in the year before death by suicide in Alberta

by Kenneth B. Morrison and Lory Laing

July 2011

Statistics Canada Statistique Canada

Canada

Adults' use of health services in the year before death by suicide in Alberta

by Kenneth B. Morrison and Lory Laing

Abstract

Background

The suicide rate in Alberta is consistently above the Canadian average. Health care use profiles of those who die by suicide in Alberta are currently unknown.

Data and methods

Death records were selected for people aged 25 to 64 with suicide coded as the underlying cause of death from April 1, 2003 to March 31, 2006. The death records were linked to administrative records pertaining to physician visits, emergency department visits, inpatient hospital separations, and community mental health visits. The control group was the Alberta population aged 25 to 64 who did not die by suicide. Frequency estimates were produced to determine the characteristics of the study population. Odds ratios relating to demographics, exposure to health care services, and case-control status were estimated with logistic regression.

Results

Almost 90% of suicides had a health service in the year before their death. Suicides averaged 16.6 visits per person, compared with 7.7 visits for non-suicides. Much of the health service use among people who died by suicide appears to have been driven by mental disorders.

Interpretation

Information about health service delivery to those who die by suicide can guide prevention and intervention efforts.

Keywords

Emergency medical services, family physicians, health services accessibility, medical record linkage, mental health, self-injurious behaviour

Authors

Kenneth B. Morrison (1-780-240-1912, ken.morrison@gov.ab.ca) was formerly with Alberta Health and Wellness and is now with Alberta Children and Youth Services, Edmonton, Alberta, T5K 2N2. Lory Laing (1-780-492-6211, llaing@ualberta.ca) is with the University of Alberta in Edmonton, Alberta, T6G 2T4.

Mental illness, particularly depressive disorder, is an important predictor of suicide.[1-4] Almost by definition, people who die by suicide are distressed, so contact with both psychiatric and primary health care services is common in the period before their death.[1,5-8]

On average, someone in Alberta dies by suicide each day. During the five years from 2002 through 2006, more than 2,000 Albertans died by suicide—over 400 a year, on average. Among the provinces, Alberta's suicide rate is second highest after Quebec.[9] While suicide prevention efforts often target the young and elderly, most suicides in Alberta occur in those middle-aged.

This study, based on linked administrative data for Albertans aged 25 to 64, examines health service use patterns of people who died by suicide. Most earlier research that has used administrative data to study suicide was limited to a single type of contact with the health care system, and few studies presented information about contact with physicians in various settings.[10] A Danish study[11] that attempted to bring together health-related administrative records found a high prevalence of psychiatric morbidity and a high rate of contacts with general practitioners (GPs) in the period close to suicide. However, it is difficult to draw generalizations from that analysis because a control group was not used, and diagnostic information was not presented.

The current study of adult Albertans who died by suicide provides both a control group (the Alberta population who did not die by suicide) and detailed diagnostic information. The linkable data sources pertain to physician visits, ambulatory care (emergency department) visits, inpatient hospitalizations, and community-based mental health services. The focus is on the use of health care services in the year before suicide—the period during which intervention might have been feasible.

Methods

Study design

Record linkage and a population-based case-control design were employed to investigate the health service use and demographics of adult Albertans who died by suicide and those who did not. Death records[12] were linked to health service records using a unique personal health number identifier obtained through deterministic linkage with

Alberta Health and Wellness (AHW) registry files.[13] Socio-demographic data available included sex, age, residence location, and health insurance premium subsidy category. The study design was approved by the Health Research Ethics Board of the University of Alberta.

Case and control selection

Cases

From a mortality database maintained by Alberta Health and Wellness,[12] records with suicide coded as the underlying cause of death (ICD-10 codes X60-X84) over the three-year period from April 1, 2003 to March 31, 2006 were selected. Records were restricted to Alberta residents aged 25 to 64. A personal health number was available for 99% (933/940) of the suicides. To ensure one year's exposure to possible health services for all cases before their death, selection was limited to individuals who were active on the AHW registry in the year they died and one year prior. This resulted in 854 suicide cases being selected for the study.

Controls

Because the objective was to compare the characteristics of those who died by suicide with the general population, 25- to 64-year-olds registered to receive health services in Alberta during the 2004/2005 fiscal year (the middle year of case selection) were chosen. The records selected represented approximately 99% of the Alberta population in that age group at the time. Suicide cases were removed. Specific subgroups, such as those with a mental disorder diagnosis, were identified for additional analyses. The selection of the controls was also limited to individuals who were active on the AHW registry during the year and one year earlier. A total of 1,752,323 controls were used for the study.

Data resources

Tracking of health service use of those who died by suicide began at April 1, 2002. A minimum of one year of retrospective data was available for all participants. Hospitalizations thought to be related to the suicide itself (same date) were excluded from analysis.

The reference for all recipient identifiers in AHW data is the Alberta Health Care Insurance Plan (AHCIP) Registry. The registry contains basic demographic and geographic information on Albertans eligible to receive health services.[13] During the study period, the registry was also used to collect health care insurance premiums. Based on AHCIP premium subsidy categories, a proxy socio-economic variable[14] was developed: no subsidy, subsidy, First Nations, and social assistance (welfare). The four categories are mutually exclusive.

AHW administrative holdings include a claims system that pays providers for billable services; this system contains recipient, provider, service and diagnostic data. Also available are hospital morbidity files, which include information on diagnosis and procedure interventions for people assigned an inpatient bed. Information about health services provided in an outpatient setting (emergency room) was obtained from the Alberta Ambulatory Care Classification System. Data were also obtained from the Alberta Mental Health Board for services provided through community mental health services.

Diagnoses for physician visits were coded in International Classification of Diseases (ICD) Version 9. Diagnoses for emergency department visits and inpatient separations were coded in ICD-10. Community mental health services diagnoses were coded in Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition and converted to ICD-9.

Analysis

Frequency estimates were produced to describe the characteristics of the study population. Health service visits were treated as a continuous variable and presented as both the percentage of individuals who had a health visit, and as the mean number of visits. The ratio of suicides to non-suicides was calculated. Confidence intervals were used to determine significant differences between groups. Logistic regression was used to estimate odds ratios relating to health service exposure, socio-demographics, and case-control status.

The regression model developed included socio-demographic variables (sex, age group, region of residence, premium subsidy category) and measures of health service use (physician visits, emergency department visits, inpatient separations, community mental health service visits). Service counts were collapsed into groups for ease of interpretation. Visits diagnosed as anxiety/stress, depression or substance disorder were included as dichotomous variables; also included were the variables of psychiatrist visit and emergency department visit with a diagnosis of intentional self-harm. The c statistic, measuring the discriminative power of the logistic equation, was 67.8%. Analyses were completed using SAS® software (version 9.1).

Results

Male, middle-aged, social assistance

The socio-demographic characteristics of people who died by suicide and those who did not differed substantially (Table 1). About three-quarters (73%) of the suicides were male, whereas the male/female ratio among non-suicides was almost 1:1. Close to two-thirds (65%) of suicides were aged 35 to 54, compared with 57% of non-suicides. Suicides were less likely than non-suicides to reside in the Calgary region, but more likely to reside in the Aspen and Peace Country regions (north of Edmonton). Compared with non-suicides, suicides were more likely to be First Nations (Status Indian) or to have received social assistance.

Use of health services

Similar percentages of suicides (86%) and non-suicides (84%) had had at least one physician visit in the previous year. Suicides, however, were much more likely than non-suicides to have had an emergency department visit (58% versus 22%), an inpatient hospital separation

Table 1
Socio-demographic characteristics of suicides and non-suicides, population aged 25 to 64 registered to receive health services, Alberta, 2002/2003 to 2005/2006

	Suicides				Non-suicides†				
			95% confidence interval				95% confidence interval		Suicide/ Non-suicide ratio
	Number	%	from	to	Number	%	from	to	
Total	854	100.0	...	...	1,752,323	100.0	...	...	...
Sex									
Women	228	26.7	23.7	29.7	871,873	49.8	49.7	49.8	0.5
Men	626	73.3	70.3	76.3	880,450	50.2	50.2	50.3	1.5
Age group									
25 to 34	167	19.6	16.9	22.2	453,748	25.9	25.8	26.0	0.8
35 to 44	288	33.7	30.6	36.9	504,398	28.8	28.7	28.9	1.2
45 to 54	265	31.0	27.9	34.1	489,595	27.9	27.9	28.0	1.1
55 to 64	134	15.7	13.3	18.1	304,582	17.4	17.3	17.4	0.9
Health region									
South/East Central	80	9.4	7.4	11.3	184,484	10.5	10.5	10.6	0.9
Calgary	261	30.6	27.5	33.7	663,138	37.8	37.8	37.9	0.8
David Thompson	91	10.7	8.6	12.7	152,006	8.7	8.6	8.7	1.2
Capital	295	34.5	31.4	37.7	553,306	31.6	31.5	31.6	1.1
Aspen/Peace Country	112	13.1	10.9	15.4	160,324	9.1	9.1	9.2	1.4
Northern Lights	12	1.4	0.6	2.2	39,009	2.2	2.2	2.2	0.6
Missing	3	0.4	...	...	56	0.0	...	...	...
Alberta Health Care Insurance Plan premium subsidy category									
No subsidy	591	69.2	66.1	72.3	1,465,092	83.6	83.6	83.7	0.8
Subsidy	72	8.4	6.6	10.3	177,820	10.1	10.1	10.2	0.8
First Nations	71	8.3	6.5	10.2	55,162	3.1	3.1	3.2	2.6
Social assistance	120	14.1	11.7	16.4	54,249	3.1	3.1	3.1	4.5

† 2004/2005 fiscal year
... not applicable
Sources: Alberta Health Care Insurance Plan Population Registry, Alberta Health and Wellness Death Database

(28% versus 6%), or a community mental health service (8% versus 1%) (data not shown). For both suicides and non-suicides, a higher percentage of women than men had accessed health services (suicides: 96% versus 87%; non-suicides: 92% versus 80%) (data not shown). Of those who died by suicide, 99% of First Nations individuals and 98% of social assistance recipients had received a health service in the year before their death.

Overall, suicides averaged more than twice the number of health service visits per person, compared with non-suicides (16.6 versus 7.7) (Figure 1). While less frequent, the difference in service use between the groups was most evident for services other than physician visits—suicides averaged 5 times more emergency department visits, 6 times more inpatient hospital separations, and 12 times more community mental health services. Women in both groups averaged notably more health visits than did men.

Considerable differences in health service use emerged by premium subsidy category. In each category, suicides averaged approximately twice as many visits as non-suicides (Figure 2). Suicides who had received social assistance averaged 34 visits, almost twice as many as the next closest subsidy category—First Nations—who averaged 18 visits.

Diagnosis

Health care visits with mental disorder diagnoses were particularly high for suicides: an average of 28 times more emergency department visits per person and almost 50 times more inpatient hospitalizations per person than non-suicides (Table 2).

For both suicides and non-suicides, depression and anxiety/stress were the mental disorder diagnoses with the highest average number of visits. Suicides, however, averaged over 60 times more inpatient separations with a depression diagnosis than did non-suicides. Relatively few visits were recorded with a diagnosis of substance-related disorder, but overall, suicides averaged 15 times more such visits than did non-suicides.

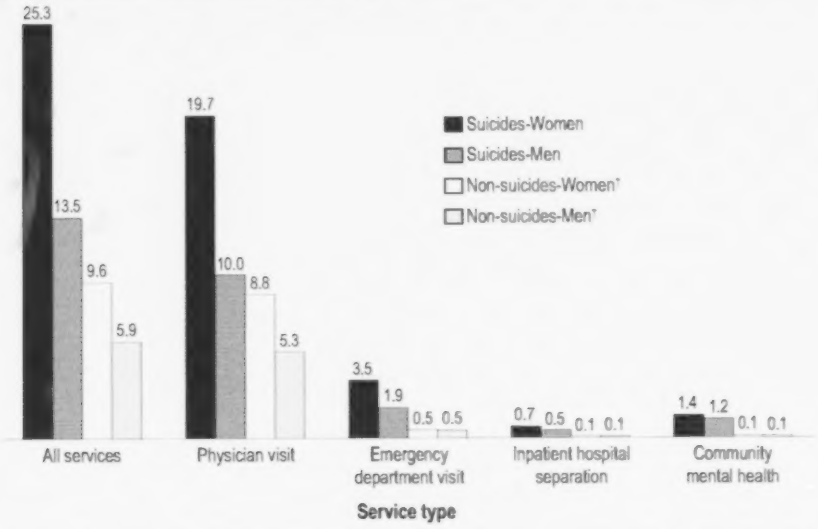
A considerable number of suicides' emergency department visits were attributable to injury and poisoning. The percentage for suicides was notably higher than the percentage for non-suicides in every injury category (for example, assault, poisoning, falls). Intentional self-harm was the emergency department injury diagnosis recorded for the highest percentage of suicides (8.4%), but the lowest percentage of non-suicides (0.1%) (data not shown).

Logistic regression analysis

When the effects of the demographic, geographic, socio-economic and service type variables were considered simultaneously, several strong associations with suicide emerged (Table 3). Men's odds of suicide were more than three times those of women. The odds of suicide among 25- to 34-year-olds were significantly lower than the odds for people aged 35 to 44. Compared with residents of the Capital Health Region (Edmonton area), those who lived in southern and eastern Alberta (Chinook, Palliser, and East-Central Health Regions) and far northeastern Alberta (Northern Lights Health Region) had low odds of suicide. The odds ratio for First Nations individuals was significantly higher than that for people who received no premium subsidy.

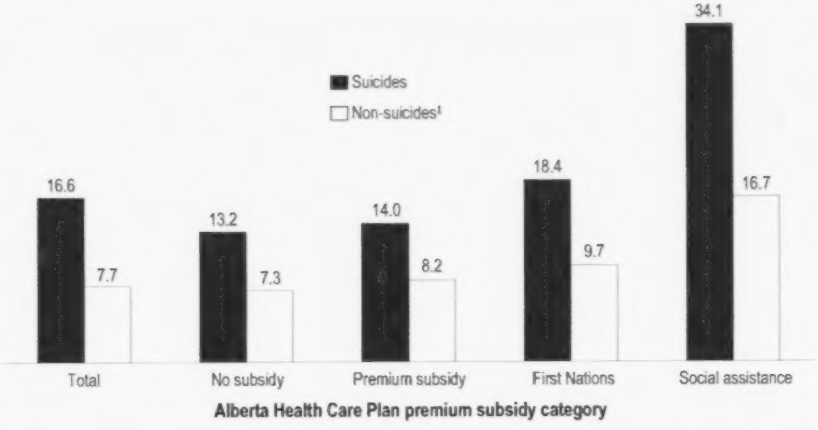
People with no or just one physician visit in the previous year had higher odds of suicide, compared with those who had 2 to 12 visits (the typical range for this age group). Having at least one

Figure 1
Mean number of health care visits in past year of suicides and non-suicides, by sex and service type, population aged 25 to 64 registered to receive health services, Alberta, 2002/2003 to 2005/2006



† 2004/2005 fiscal year
Sources: Alberta Health Care Insurance Plan Population Registry, Alberta Health and Wellness Death Database, Alberta Health and Wellness Physician Claims files, Alberta Ambulatory Care Classification System, Alberta Health and Wellness Inpatient Hospital files, Alberta Mental Health Board

Figure 2
Mean number of health care visits† in past year of suicides and non-suicides, by Alberta Health Care Insurance Plan premium subsidy category, population aged 25 to 64 registered to receive health services, Alberta, 2002/2003 to 2005/2006



† physician visits, emergency department visits, inpatient separations, and community mental health services
‡ 2004/2005 fiscal year
Sources: Alberta Health Care Insurance Plan Population Registry, Alberta Health and Wellness Death Database, Alberta Health and Wellness Physician Claims files, Alberta Ambulatory Care Classification System, Alberta Health and Wellness Inpatient Hospital files, Alberta Mental Health Board

What is already known on this subject?

- Contact with psychiatric and primary care services is common in the time preceding suicide.
- Mental illness, particularly depressive disorder, is an important predictor of suicide.
- Most studies that have used administrative data to study health care use before suicide were limited to a single type of contact, and few presented information about health care contacts in different settings.

What does this study add?

- This study provides detailed diagnostic information from a variety of administrative databases and uses a control group (the entire Alberta population who did not die by suicide).
- Almost 90% of those who died by suicide received a health service during the year before their death.
- Groups thought to be at risk of not accessing health services had, in fact, higher service use.
- Of those with a diagnosis of depression, suicides were considerably more likely than non-suicides to have a depression diagnosis through an emergency department visit, an inpatient separation, or a community mental health service visit.
- Almost 60% of those who died by suicide had an emergency department visit in the year before their death.

Table 2
Mean number of health care visits in past year of suicides and non-suicides, by service type and ICD diagnostic chapter, population aged 25 to 64 registered to receive health services, Alberta, 2002/2003 to 2005/2006

	Suicides[†]					Non-suicides[‡]					
			95% confidence interval					95% confidence interval			
ICD-9 Diagnostic Chapter	Number	Mean	from	to	Standard error	Number	Mean	from	to	Standard error	Suicide/ Non-suicide ratio
Physician visits (ICD-9)											
Total	**10,736**	**12.57**	**11.50**	**13.64**	**0.55**	**12,345,668**	**7.05**	**7.03**	**7.06**	**0.01**	**1.8**
5 Mental disorders	4,492	5.26	4.49	6.03	0.39	1,045,061	0.60	0.59	0.60	0.00	8.8
Anxiety/Neurosis/Stress	1,442	1.69	1.23	2.14	0.23	381,658	0.22	0.22	0.22	0.00	7.8
Depressive disorders	1,523	1.78	1.47	2.10	0.16	392,380	0.22	0.22	0.23	0.00	8.0
Substance-related disorders	235	0.28	0.19	0.36	0.04	39,241	0.02	0.02	0.02	0.00	12.3
6 Nervous and sense organs	407	0.48	0.32	0.63	0.08	594,806	0.34	0.34	0.34	0.00	1.4
8 Respiratory	450	0.53	0.45	0.61	0.04	887,828	0.51	0.50	0.51	0.00	1.0
10 Genitourinary	215	0.25	0.19	0.31	0.03	684,953	0.39	0.39	0.39	0.00	0.6
12 Skin and subcutaneous	318	0.37	0.28	0.46	0.05	521,175	0.30	0.30	0.30	0.00	1.3
13 Musculoskeletal	1,195	1.40	1.16	1.64	0.12	2,116,594	1.21	1.20	1.21	0.00	1.2
16 Symptoms and signs	1,211	1.42	1.20	1.64	0.11	1,385,894	0.79	0.79	0.79	0.00	1.8
17 Injury and poisoning	754	0.88	0.72	1.05	0.08	1,399,248	0.80	0.79	0.80	0.00	1.1
VC Factors influencing health	511	0.60	0.45	0.74	0.07	1,559,665	0.89	0.89	0.89	0.00	0.7
All other Chapters (and uncoded)	1,183	1.39	1.21	1.57	0.09	2,150,444	1.23	1.22	1.23	0.00	1.1
Emergency department visits (ICD-10)											
Total	**1,968**	**2.30**	**1.85**	**2.76**	**0.23**	**855,770**	**0.49**	**0.49**	**0.49**	**0.00**	**4.7**
V Mental and behavioural	485	0.57	0.46	0.67	0.05	36,083	0.02	0.02	0.02	0.00	27.6
Anxiety/Neurosis/Stress	112	0.13	0.09	0.17	0.02	11,258	0.01	0.01	0.01	0.00	20.4
Depressive disorders	135	0.16	0.12	0.20	0.02	6,230	0.00	0.00	0.00	0.00	44.5
Substance-related disorders	104	0.12	0.09	0.16	0.02	11,533	0.01	0.01	0.01	0.00	18.5
VI Nervous	62	0.07	0.01	0.13	0.03	26,856	0.02	0.01	0.02	0.00	4.7
X Respiratory	62	0.07	0.05	0.10	0.01	71,936	0.04	0.04	0.04	0.00	1.8
XI Digestive	85	0.10	0.07	0.13	0.02	55,643	0.03	0.03	0.03	0.00	3.1
XII Skin and subcutaneous	57	0.07	0.04	0.09	0.01	28,026	0.02	0.02	0.02	0.00	4.2
XIII Musculoskeletal	102	0.12	0.08	0.16	0.02	56,947	0.03	0.03	0.03	0.00	3.7
XVIII Symptoms and signs	185	0.22	0.18	0.26	0.02	110,800	0.06	0.06	0.06	0.00	3.4
XIX Injury and poisoning	423	0.50	0.43	0.56	0.03	179,922	0.10	0.10	0.10	0.00	4.8
XXI Factors influencing health	394	0.46	0.13	0.79	0.17	158,958	0.09	0.09	0.09	0.00	5.1
All other Chapters	113	0.13	0.10	0.17	0.02	130,599	0.07	0.07	0.08	0.00	1.8
Inpatient separations (ICD-10)											
Total	**452**	**0.53**	**0.45**	**0.61**	**0.04**	**147,507**	**0.08**	**0.08**	**0.08**	**0.00**	**6.3**
II Neoplasms	9	0.01	0.00	0.02	0.00	9,651	0.01	0.01	0.01	0.00	1.9
V Mental and behavioural	292	0.34	0.28	0.40	0.03	12,347	0.01	0.01	0.01	0.00	48.5
Anxiety/Neurosis/Stress	42	0.05	0.03	0.06	0.01	1,696	0.00	0.00	0.00	0.00	50.8
Depressive disorders	83	0.10	0.07	0.13	0.02	2,802	0.00	0.00	0.00	0.00	60.8
Substance-related disorders	65	0.08	0.05	0.10	0.01	2,750	0.00	0.00	0.00	0.00	48.5
IX Circulatory	11	0.01	0.00	0.02	0.00	10,427	0.01	0.01	0.01	0.00	2.2
X Respiratory	17	0.02	0.01	0.03	0.01	6,644	0.00	0.00	0.00	0.00	5.3
XI Digestive	22	0.03	0.01	0.04	0.01	16,128	0.01	0.01	0.01	0.00	2.8
XIV Genitourinary system	8	0.01	0.00	0.02	0.00	10,480	0.01	0.01	0.01	0.00	1.6
XV Pregnancy and childbirth	5	0.01	0.00	0.01	0.00	34,666	0.02	0.02	0.02	0.00	0.3
XIX Injury and poisoning	41	0.05	0.03	0.07	0.01	12,424	0.01	0.01	0.01	0.00	6.8
XXI Factors influencing health	12	0.01	0.01	0.02	0.00	8,666	0.00	0.00	0.01	0.00	2.8
All other Chapters	35	0.04	0.02	0.06	0.01	26,074	0.01	0.01	0.02	0.00	2.8

† suicides N=854; non-suicides N=1,752,323
‡ 2004/2005 fiscal year

Notes: Physician claims on same day in same facility with same diagnosis and provider specialty are consolidated. Excludes emergency department visits and inpatient separations on day of death.
Sources: Alberta Health Care Insurance Plan Population Registry, Alberta Health and Wellness Death Database, Alberta Health and Wellness Physician Claims files, Alberta Ambulatory Care Classification System, Alberta Health and Wellness Inpatient Hospital files.

Table 3
Adjusted odds ratios relating selected characteristics to suicides, population aged 25 to 64 registered to receive health services, Alberta, 2002/2003 to 2005/2006

Effect	Adjusted odds ratio	95% confidence interval		Effect p-value
		from	to	
Sex				< 0.001
Women[1]	1.00			
Men	3.33***	2.84	3.91	
Age group				< 0.001
25 to 34	0.61***	0.50	0.74	
35 to 44[1]	1.00			
45 to 54	1.03	0.87	1.21	
55 to 64	0.93	0.75	1.14	
Health region				0.024
South/East Central	0.72**	0.56	0.92	
Calgary	0.89	0.76	1.06	
David Thompson	0.99	0.78	1.26	
Capital[1]	1.00			
Aspen/Peace Country	1.04	0.83	1.31	
Northern Lights	0.52*	0.29	0.93	
Alberta Health Care Insurance Plan premium subsidy category				0.001
No subsidy[1]	1.00			
Subsidy	1.00	0.78	1.28	
First Nations	1.67***	1.28	2.18	
Social assistance	1.23	0.98	1.54	
Number of physician visits				< 0.001
0 to 1	1.63***	1.34	1.97	
2 to 12[1]	1.00			
13 or more	0.95	0.79	1.13	
Number of emergency department visits				< 0.001
0[1]	1.00			
1	2.25***	1.86	2.72	
2 or more	3.28***	2.69	4.00	
Inpatient hospital separation[2]	1.56***	1.28	1.90	< 0.001
Community mental health visit[2]	1.23	0.93	1.62	0.142
Anxiety/Stress diagnosis visit[2]	1.82***	1.52	2.17	< 0.001
Depression diagnosis visit[2]	3.27***	2.71	3.95	< 0.001
Substance disorder visit[2]	1.88***	1.50	2.35	< 0.001
Psychiatrist visit[2]	3.20***	2.59	3.94	< 0.001
Self-harm emergency department visit[2]	5.25***	3.93	7.00	< 0.001

[1] reference category
[2] reference category is absence of characteristic
* significantly different from reference category (p<0.05)
** significantly different from reference category (p<0.01)
*** significantly different from reference category (p<0.001)
.. not applicable

Sources: Alberta Health Care Insurance Plan Population Registry, Alberta Health and Wellness Death Database, Alberta Health and Wellness Physician Claims files, Alberta Ambulatory Care Classification System, Alberta Health and Wellness Inpatient Hospital files, Alberta Mental Health Board.

emergency department visit was strongly associated with suicide, as was having at least one inpatient hospital separation. Community mental health service visits were not significantly associated with suicide.

All three mental disorder diagnoses in the model were significantly associated with suicide, particularly depression. Having a psychiatrist visit was also strongly associated with suicide. The odds of suicide among people who had an emergency department visit with a diagnosis of intentional self-harm were five times the odds for people who did not have this experience.

Discussion

The aim of this study was to determine if people who die by suicide in Alberta have particular risk factors or distinctive health care use profiles that could be taken into account in suicide prevention. Findings of previous studies about the frequency of health care contacts and the importance of mental illness as a predictor of suicide were reinforced. As expected, the demographic characteristics of those who died by suicide differed from the characteristics of those who did not. The highest prevalence of suicide was among middle-aged men.[15]

Most large-scale studies of suicide that include an income measure are ecological.[16] This analysis, however, was strengthened by the inclusion of an individual-level proxy variable for socio-economic status, rare in large-scale studies based on administrative data. It was also possible to identify First Nations individuals, and they made up a larger percentage of those who died by suicide than they did of the general population.[14,17,18] One result not fully anticipated was that social assistance recipients (non-First Nations) made up an even greater share of suicides.

Overall, almost 90% of suicides had a health service contact during the year before death; 86% had a physician visit, a figure that exceeds the 76% reported in a review of 40 suicide studies by Luoma et al.[1]

Contrary to other research,[6,19] this analysis found that groups thought to be at risk of not accessing health services were, in fact, among the higher service users. In this study of those who died by suicide, almost all First Nations individuals (99%) and social assistance recipients (98%) had had a health service contact in the year before their death. First Nations suicides averaged 18 visits; social assistance recipients, 34 visits.

Much of the health service use among people who died by suicide appears to have been driven by mental disorders: 60% of suicides, compared with 18% of non-suicides, had a health care visit with a mental disorder diagnosis in the previous year. By contrast, the percentage of suicides diagnosed with substance-related disorders was low, compared with other studies.[20-22] For example, Tanney's review of psychological autopsy studies reported a median of 41% of suicides with a diagnosis of substance abuse.[20] A possible explanation for the discrepancy is that many of the substance treatment programs in Alberta were operated by the Alberta Alcohol and Drug Abuse Commission (AADAC), whose data were not included in this study. As well, because the psychological autopsy model can capture suicide cases who did not receive health services, such studies are bound to be more sensitive to underlying conditions than are administrative data.[11]

With such a high prevalence of treated mental disorders among suicides, a better control group than *all* non-suicides might be non-suicides *with a mental disorder*. However, in analyses limited to suicides and non-suicides with a diagnosis of depression in the year, differences persisted. Most suicides diagnosed with depression were male, whereas most non-suicides diagnosed with depression were female. While service use for both groups varied considerably by sex, differences between men and women were still less than differences between suicides and non-suicides. Almost all non-suicides received their depression diagnosis through physician visits; suicides were considerably more likely to have had the diagnosis in an emergency department visit, an inpatient separation, or a community mental health service.

In this study, close to 60% of suicides had had an emergency department visit in the year before their death, well above the 39% reported by Gairin et al. in the U.K.[23] (some of the difference obviously reflects the different medical systems). Regression analysis undertaken in this study confirmed the strong association between emergency department visits and subsequent suicide.

Limitations

AHW data are collected for administrative purposes, which must be considered when interpreting the results of analysis.

A larger percentage of the population may have had a health visit with a mental health diagnosis than is indicated in this analysis, but because of data quality concerns, information from the Alberta Mental Health Board was restricted to community mental health services. As well, diagnostic coding for physician visits tends not to be as specific as diagnoses for emergency department visits or inpatient hospital separations.

Conclusions

Almost 90% of those who died by suicide in Alberta received a health service in the year before their death, and they had, on average, 17 health visits. While the vast majority of those who died by suicide saw a GP in the year before their death, the greatest ratio differences in health care contacts between suicides and non-suicides were for services other than physician visits. ■

References

1. Luoma JB, Martin CE, Pearson JL. Contact with mental health and primary care providers before suicide: a review of the evidence. *American Journal of Psychiatry* 2002; 159(6): 909-16.
2. Langlois S, Morrison P. Suicide deaths and attempts. *Canadian Social Trends* (Statistics Canada, Catalogue 11-008) 2002; 66 (Autumn): 20-5.
3. Edwards N, Alaghehbandan R, MacDonald D, et al. Suicide in Newfoundland and Labrador: A linkage study using medical examiner and vital statistics data. *Canadian Journal of Psychiatry* 2008; 53(4): 252-9.
4. Chang C-M, Liao S-C, Chiang H-C, et al. Gender differences in healthcare service utilization 1 year before suicide: national record linkage study. *British Journal of Psychiatry* 2009; 195: 459-60.
5. Goldacre M, Seagroatt V, Hawton K. Suicide after discharge from psychiatric inpatient care. *Lancet* 1993; 342: 283-6.
6. Vassilas CA, Morgan HG. General practitioners' contact with victims of suicide. *British Medical Journal* 1993; 307: 300-1.
7. Pirkis J, Burgess P. Suicide and recency of health care contacts – A systematic review. *British Journal of Psychiatry* 1998; 173: 462-74.
8. Deisenhammer E, Huber M, Kemmler G, et al.. Suicide victims' contacts with physicians during the year before death. *European Archives of Psychiatry and Clinical Neuroscience* 2007; 257: 480-5.
9. Statistics Canada. Leading causes of death, total population, by sex, Canada, provinces and territories, annual. CANSIM Table 102-0563. Ottawa: Statistics Canada, 2008. Available at: http://cansim2.statcan.ca. Accessed February 19, 2010.
10. Hydén LC. Care utilization and the incidence of suicide: Suicide cases contacts with primary health care and psychiatry in six psychiatric districts in the County of Stockholm from 1979-1990. *Acta Psychiatrica Scandinavica* 1996; 93: 442-6.
11. Andersen UA, Andersen M, Rosholm JU, Gram LF. Contacts to the health care system prior to suicide: a comprehensive analysis using registers for general and psychiatric hospital admissions, contacts to general practitioners and practising specialists and drug prescriptions. *Acta Psychiatrica Scandinavica* 2000; 102: 126-34.
12. Alberta Health and Wellness. *Death Database*. Available at: M: HealthSurveillance Stats Data Vital deth8307.dbf. Accessed December 5, 2008.
13. Alberta Health and Wellness. *Data Disclosure Handbook - Part VI: Data Resources at Alberta Health and Wellness*. Edmonton, Alberta: Alberta Health and Wellness, 2003.
14. Wang F, Gabos S, Mackenzie A, et al. The socioeconomic status marker from administrative data: is it accurate? IEA: XVI World Congress of Epidemiology, Montreal, August 18-22, 2002.
15. Alberta Mental Health Board. *A Call to Action: The Alberta Suicide Prevention Strategy*. Edmonton, Alberta: Alberta Health Services, 2005. Available at: http://www.amhb.ab.ca/Publications reports Pages/SuicidePrevention.aspx. Accessed December 17, 2008.
16. Trovato, F. An ecological analysis of suicide: Canadian CMAs. *International Review of Modern Sociology* 1992; 22: 57-72.
17. United States Department of Health and Human Services. *The Surgeon General's Call to Action to Prevent Suicide*. Washington, D.C.: United States Department of Health and Human Services, 1999. Available at: http://www.surgeongeneral.gov/library/calltoaction/default.htm. Accessed December 17, 2008.
18. Centre for Suicide Prevention. *Suicide among Canada's Aboriginal Peoples*. SIEC Alert #52. Calgary, Alberta: Centre for Suicide Prevention, 2003. Available at: http://www.suicideinfo.ca/csp/assets/Alert52.pdf. Accessed February 25, 2009.
19. Mock CN, Grossman DC, Mulder D, et al. Health care utilization as a marker for suicidal behaviour on an American Indian Reservation. *Journal of General Internal Medicine* 1996; 11: 519-24.
20. Tanney BL. Psychiatric diagnoses and suicidal acts. In: Maris RW, Berman AL, Silverman MM (eds.). *Comprehensive Textbook of Suicidology*. New York: The Guildford Press, 2000: 311-4.
21. Lesage A, Séguin M, Guy A, et al. Systematic services audit of consecutive suicides in New Brunswick: The case for coordinating specialist mental health and addiction services. *Canadian Journal of Psychiatry* 2008; 53(10): 671-8.
22. Wang AG, Stora T. Core features of suicide. Gender, age, alcohol and other putative risk factors in a low-incidence population. *Nordic Journal of Psychiatry* 2009; 63(2): 154-9.
23. Gairin I, House A, Owens D. Attendance at the accident and emergency department in the year before suicide: retrospective study. *British Journal of Psychiatry* 2003; 83: 28-33.